CLAIMS

What is claimed is:

1. A method for promoting growth of mammalian neural cells comprising:

contacting neural cells with a preparation comprising

(a) a morphogen comprising a dimeric protein having an amino acid sequence with at least 70% homology with the C-terminal seven cysteine skeleton of human OP-1, and

(b) a GDNF/NGF neurotrophic factor.

2. A method for inhibiting the degeneration of mammalian neural cells comprising:

contacting neural cells with a preparation comprising

(a) a morphogen comprising a dimeric protein having an amino acid sequence with at least 70% homology with the C-terminal seven cysteine skeleton of human OP-1, and

(b) a GDNF/NGF neurotrophic factor.

3. A method for treating a mammalian subject afflicted with damage or injury to neural cells comprising:

contacting neural cells with a preparation comprising

(a) a morphogen comprising a dimeric protein having an amino acid sequence with at least 70% homology with the C-terminal seven cysteine skeleton of human OP-1, and

(b) a GDNF/NGF neurotrophic factor.

4. A method for treating a mammalian subject at imminent risk of damage or injury to neural cells comprising:

contacting said neural cells with an effective concentration of a preparation comprising

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.

5. A method as in any one of claims 3-4 wherein said damage or injury comprises a mechanical trauma to a tissue comprising said cells.

6. A method as in claim 5 wherein said mechanical trauma is selected from the group consisting of blunt force traumatic brain injury, blunt force traumatic spinal cord injury,

concussion, intracranial pressure due to cerebral edema or subdural haematoma, broken or crushed vertebra, and torn or severed nerves.

7. A method as in any one of claims 3-4 wherein said damage or injury comprises a chemical trauma to a tissue comprising said cells.

8. A method as in any one of claims 3-4 wherein said damage or injury comprises ischemia of a tissue comprising said cells.

9. A method as in any one of claims 3-4 wherein said damage or injury results from a neuropathic disease.

10. A method as in claim 9 wherein said neuropathic disease is selected from the group consisting of Parkinson's disease, Huntington's disease, Amyotrophic Lateral Sclerosis, Alzheimer's disease, epilepsy, progressive muscular atrophy, Charcot-Marie-Tooth disease, palsy, dementia, Shy-Drager disease, Wernicke-Korsakoff syndrome, and Hallervorden-Spatz disease.

11. A method as in any one of claims 1-4 wherein said neural cells comprise neurons or neuroglial cells.

12. A method as in any one of claims 1-4 wherein said neural cells comprise central nervous system neural cells.

13. A method as in any one of claims 1-4 wherein said neural cells comprise peripheral nervous system cells.

14. A method as in any one of claims 1-4 wherein said OP/BMP morphogen comprises an amino acid sequence having at least 70% homology with the C-terminal seven-cysteine domain of human OP-1.

15. A method as in claim 14 wherein said OP/BMP morphogen comprises an amino acid sequence having at least 80% homology with the C-terminal seven-cysteine domain of human OP-1.

16. A method as in claim 14 wherein said OP/BMP morphogen comprises an amino acid sequence having at least than 60% amino acid identity with the C-terminal seven-cysteine domain of human OP-1.

17. A method as in claim 14 wherein said OP/BMP morphogen comprises an amino acid sequence having at least than 70% amino acid identity with the C-terminal seven-cysteine domain of human OP-1.

18. A method as in claim 14 wherein said OP/BMP morphogen comprises at least the C-terminal six- or seven-cysteine domain of a mammalian protein selected from the group consisting of OP-1, OP-2, OP-3, BMP2, BMP3, BMP4, BMP5, BMP6, and BMP9.

19. A method as in any one of claims 1-4 wherein said effective concentration is between 0.1 ng/ml and 10 μg/ml of said OP/BMP morphogen and between 0.1 ng/ml and 10 μg/ml of said GDNF/NGF neurotrophic factor.

20. A method as in claim 19 wherein said effective concentration is between 1 ng/ml and 100 ng/ml of said OP/BMP morphogen.

21. A method as in claim 19 wherein said effective concentration is between 1 ng/ml and 100 ng/ml of said GDNF/NGF neurotrophic factor.

22. A method as in claim 19 wherein said effective concentration is between 1 ng/ml and 100 ng/ml of said OP/BMP morphogen and between 1 ng/ml and 100 ng/ml of said GDNF/NGF neurotrophic factor.

23. A method as in any one of claims 1-4 wherein said GDNF/NGF neurotrophic factor comprises a mature, functional form of a protein selected from the group consisting of GDNF, NGF, BDNF, NT-3, NT-4, NT-5 and NT-6.

24. A method for promoting the survival or growth of mammalian cells, wherein said cells express an OP/BMP-activated serine/threonine kinase receptor and a GDNF/NGF-activated tyrosine kinase receptor, comprising

contacting said cells with an effective concentration of a preparation comprising:

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.

25. A method for inhibiting the death or degeneration of mammalian cells, wherein said cells express an OP/BMP-activated serine/threonine kinase receptor and a GDNF/NGF-activated tyrosine kinase receptor, comprising

contacting said cells with an effective concentration of a preparation comprising:

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.

26. A method for treating a mammalian subject afflicted with damage or injury to cells, wherein said cells express an OP/BMP-activated serine/threonine kinase receptor and a GDNF/NGF-activated tyrosine kinase receptor, comprising

contacting said cells with an effective concentration of a preparation comprising:

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.

27. A method for treating a mammalian subject at imminent risk of damage or injury to cells, wherein said cells express an OP/BMP-activated serine/threonine kinase receptor and a GDNF/NGF-activated tyrosine kinase receptor, comprising

contacting said cells with an effective concentration of a preparation comprising:

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.

28. A pharmaceutical preparation for promoting the survival or growth of mammalian neural cells comprising:

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.

29. A pharmaceutical preparation for inhibiting the death or degeneration of mammalian neural cells comprising:

(a) a GDNF/NGF neurotrophic factor, and

(b) an OP/BMP morphogen.